

## HYLID FROGS FROM THE MID-MIOCENE CAMFIELD BEDS OF NORTHERN AUSTRALIA.

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### ABSTRACT

Three new anuran species representing hylids of the genera *Australobatrachus* Tyler and *Litoria* Tschudi are reported from the Tertiary Camfield Beds at Camfield Station in the north-west of the Northern Territory. The material comprises 10 fragmentary ilia and a sacral vertebra, and constitute the second Tertiary record of frogs for northern Australia, and the first for the Northern Territory.

KEYWORDS: Anura, Hylidae, new species, Miocene, Camfield Beds, Australia, *Australobatrachus*, *Litoria*.

### INTRODUCTION

Knowledge of the Tertiary frog fauna of northern Australia has been confined to material recovered from the rich Oligo-Miocene deposits at Riversleigh Station in north-west Queensland. To date, representatives of six hylid and leptodactylid genera have been reported from sites there: *Litoria* Tschudi, *Crinia* Tschudi, *Kyarranus* Moore, *Lechriodus* Günther, *Limnodynastes* Fitzinger and *Philoria* Parker (Tyler, 1989, 1990, 1991a, 1991b, 1991c, in press).

Here I report material from a Tertiary locality in the Northern Territory - the mid-Miocene Camfield Beds on Camfield Station, located on the Buchanan Highway. The material also represents the first record of fossil frogs from the Northern Territory.

### MATERIAL AND METHODS

The specimens reported here are all deposited in the palaeontological collections of the Northern Territory Museum, Darwin. Descriptive terminology of ilia follows Tyler (1976). Scanning electron microscopy involved the use of a Cambridge 5250 housed in the CSIRO Division of Soils, Glen Osmond, South Australia.

### SYSTEMATICS

#### Order ANURA Rafinesque

#### Family Hylidae Gray

#### *Australobatrachus* Tyler

#### *Australobatrachus undulatus* sp. nov.

(Fig. 1)

**HOLOTYPE** - NTMP936, unrecorded quarry, Bullock Creek Locality, Camfield Station, Northern Territory (17° 00' S; 131° 30' E), Bullock Creek Local Fauna, mid-Miocene. Proximal portion of a right ilium.

**PARATYPES** - The proximal portions of two right ilia: NTM P8697-33, from 'Dromornithid Mountain' and P87114-8 from 'Top Site', both from the Bullock Creek Locality.

**Description of holotype.** In the holotype (Fig. 1), the dorsal acetabular expansion, dorsal prominence and protuberance and pre-acetabular zone are complete. The only diagnostic portion of the ilium lacking in this specimen is the ventral acetabular expansion, and the ventral rim to the acetabular fossa.

The dorsal acetabular expansion is low and on a level with the dorsal face of the ilial shaft. The dorsal prominence is large but only weakly raised and the dorsal protuberance scarcely elevated from it. The preacetabular zone is evenly curved and broad. The ilial shaft bears a broad

and shallow, longitudinal groove. Total length of specimen 6.5 mm.

**Comparison with other species.** The type species *A. illius* Tyler is readily distinguished by the sharp definition of the lateral groove which is narrow, rather than the greater wave-like form across the lateral surface of the entire shaft in *A. undulatus*.

**Etymology.** Derived from *undulatus* (L.) meaning wave and referring to the wave-like surface of the ilial shaft.

**Comment.** Previously, *Australobatrachus* has been known from the Tertiary of South Australia, principally from the Oligocene (Lindsay 1987) in the Ditjimanka and Ngama Local Faunas at Lake Palankarinna (Tyler 1976, 1982, 1986).

### *Litoria* Tschudi

#### *Litoria conicula* sp. nov.

(Fig. 2)

**HOLOTYPE** - NTMP933. Unrecorded quarry, Bullock Creek Locality, Camfield Station, Northern Territory (17° 07' S; 131° 31' E), Bullock Creek Local Fauna, mid-Miocene. A right ilium.

**Description of holotype.** The dorsal acetabular expansion is slightly developed. The dorsal prominence is conspicuous but small and conical; the dorsal protuberance is not distinguishable. The ilial shaft is gently curved and bears a slight lateral depression on the proximal half. The pre-acetabular zone is moderate and gently curved and the acetabulum very large. Length of ilium 12.4 mm.

**Comparison with other species.** The small conical dorsal prominence is unlike any extant species, and the single extinct Tertiary species *L. magna* Tyler, which is also distinguished from *L. conicula* by possession of a right-angled flange upon the summit of the medial surface of the ilial shaft.

**Etymology.** From *coniculus* (L.), a cone, referring to the conical form of the dorsal prominence.

**Comment.** Although this species is known solely from the holotype, its fine condition, distinctive characters and the low frequency of occurrence of material from Bullock Creek justify the description of the species.

#### *Litoria curvata* sp. nov.

(Fig. 3)

**HOLOTYPE** - NTMP938. Unrecorded quarry, Bullock Creek Locality, Camfield Station, North-

ern Territory (17° 07' S; 131° 31' E), Bullock Creek Local Fauna, mid-Miocene. Proximal two-thirds of a left ilium.

**PARATYPES** - Four ilia: NTM P934, P935, P937, P8697-32. Unrecorded quarries except P8697-32 ('Site X'). Locality data as for holotype. There is minimal variability in this series. The ventral acetabular expansion is missing in all specimens.

**Description of holotype.** The dorsal acetabular expansion is slightly inclined and the dorsal prominence and dorsal protuberance inclined laterally. The ilial shaft is almost straight. The ventral acetabular expansion is broad and evenly curved, forming a quadrant with the inferior surface of the ilial shaft. The acetabular fossa is large and extends superiorly above the level of the inferior margin of the ilial shaft.

**Comparisons with other species.** From the other *Litoria* species included in the Bullock Creek Local Fauna (*L. conicula*), *L. curvata* is distinguished most readily by the form of the dorsal prominence (large and flattened or laterally disposed in *L. curvata*; small and conical in *L. conicula*), and from the other Tertiary species (*L. magna*) by the lack of a flange upon the medial surface of the ilial shaft.

**Etymology.** From *curvus* (L.), bent, alluding to the curvature of the pre-acetabular zone of the ilium of the species.

## DISCUSSION

Camfield Station represents the fourth locality in Australia at which Tertiary frogs have been reported. Three species and two genera are included in the small sample and, at a generic level, there is a similarity to the material obtained from the Etadunna Formation at Lake Palankarinna, north of Lake Eyrc, South Australia (Table 1).

**Table 1.** Occurrence of frog genera at Tertiary sites in Australia.

Genus	Lake Palankarinna SA	Lake Yanda SA	Riversleigh Station Qld	Camfield Station NT
<i>Australobatrachus</i>	+	+		+
<i>Crinia</i>			+	
<i>Kyarranus</i>			+	
<i>Lechriodus</i>			+	
<i>Litoria</i>	+		+	+
<i>Limnodynastes</i>	+		+	
<i>Philoria</i>			+	

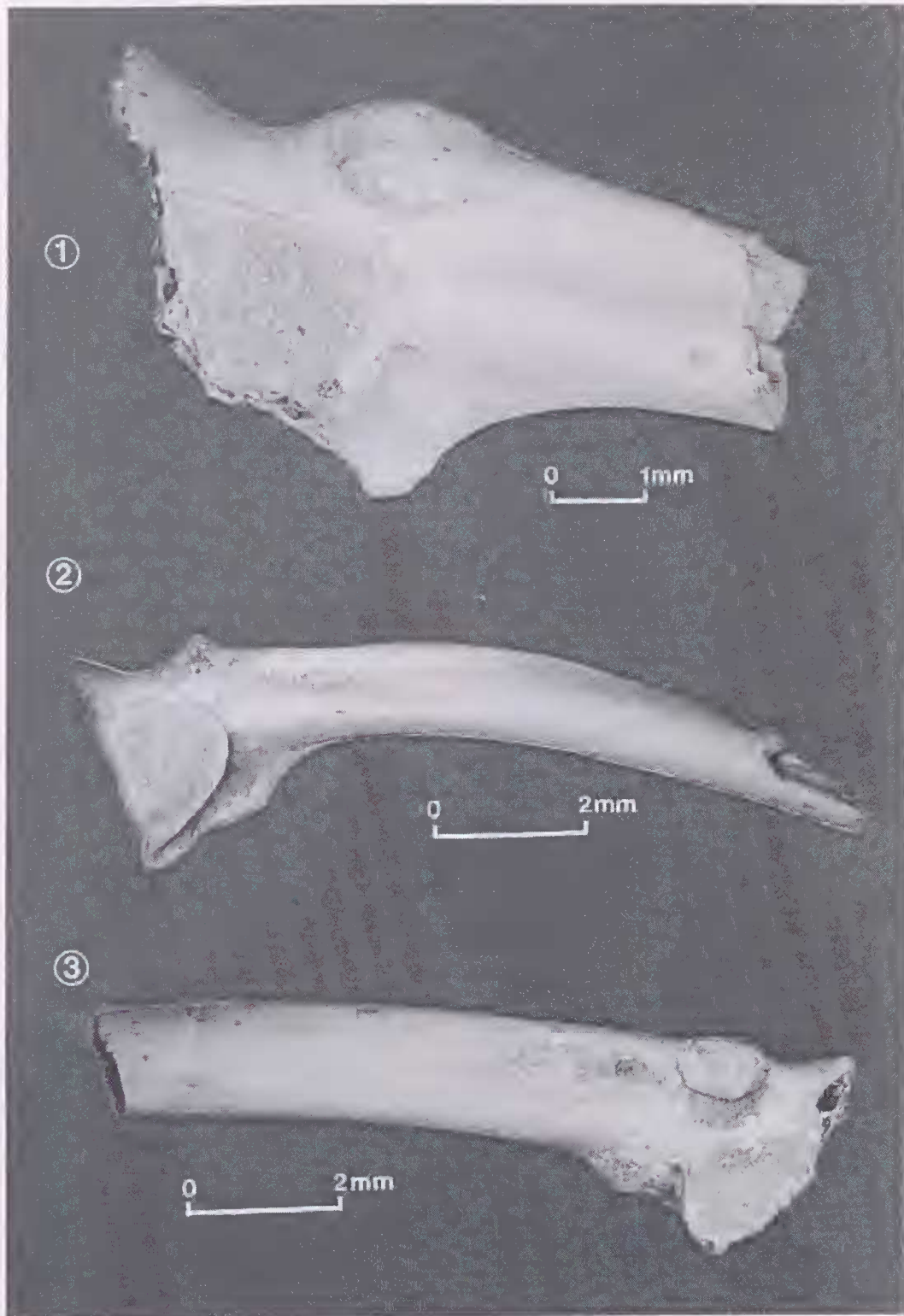


Fig. 1. (Upper) Holotype of *Australobatrachus undulatus* sp. nov. (NTM P936). Fig. 2. (Centre) Holotype of *Litoria conicula* sp. nov. (NTM P933). Fig. 3. (Lower) Holotype of *Litoria curvata* sp. nov. (NTM P938).

The presence of crocodiles, fish and turtles amongst the vertebrates in the Bullock Creek Local Fauna (Murray and Megirian 1992) signifies a reasonably substantial body of persistent water. The frog species included do not contribute to any further understanding of the palaeoenvironment because it is uncertain whether the species are terrestrial or aquatic. All that can be stated is that the ilia lack fossorial adaptations. Although the sample is small, the seasonal aridity interpretation as a palaeoclimatic scenario (Murray and Megirian 1992) would be expected to be accompanied by a fossorial element in the frog fauna. The Camfield Beds were considered to be mid-Miocene by Woodburne *et al.* (1985).

Murray and Megirian (1992) state that the 'Dromornithid Mountain' and 'Top Site' quarries are in conglomeratic limestone, probably representing stream channels, and that more material has been produced from such sites than from those considered to be lacustrine deposits (e.g. 'Site X').

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